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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,298	03/01/2004	Khoi A. Phan	H0266 / AMDP812US	9262

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EXAMINER	
LE, THAO X	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 12/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/790,298	PHAN ET AL.
	Examiner	Art Unit
	Thao X. Le	2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-7 and 23-31* is/are pending in the application.

4a) Of the above claim(s) *28-31* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7 and 23-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on ___ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Newly submitted claims 28-31 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 28-31 is a method claims comprising both heat inducing to and heat dissipating from the semiconductor device.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 28-31 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6128188 to Hanners.

Regarding claim 1, Hanners discloses a heat regulating device for regulating a heat flow into and out of an integrated circuit semiconductor body in fig. 1-2 comprising: a thermo-electrical structure 10, column 3 line 48, that induces heat to and/or dissipates generated heat away from a region of a semiconductor body 12, col. 3 lines 49-50; and

at least one layer of a conductive material18, col. 3 line 52, in contact with the thermo-electrical structure for conducting heat flow.

Regarding claim 2, Hanners discloses the heat regulating device wherein the thermo-electrical structure is trough within the body of the layer of the conductive material 18, fig. 2.

Regarding claims 3-6, Hanners discloses the heat regulating device further comprising a plurality of the thermo-electrical structures connected form a spreading assembly 10, fig. 1, wherein the spreading assembly 10 is operatively connected to a heat sink 22, fig. 1, wherein the thermo-electrical structure is a conductive pathway for heat transfer, wherein the thermo-electrical structure has a structure selected from a group consisting of maze-shaped structure, fig. 1.

Regarding claim 7, Hanners discloses a heat regulating device for regulating a heat flow of an integrated circuit comprising: means 10, fig. 1, for inducing heat into or dissipating heat away from a region of a semiconductor body 12 of the integrated circuit; and heat conducting means 18 in contact with the means for inducing heat into or dissipating heat away from the region of the semiconductor body 12.

4. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by US 6098408 to Levinson et al.

Regarding claims 1 and 7, Levinson discloses in fig. 1-2 a heat regulating device for regulating a heat flow into and out of an integrated circuit semiconductor body comprising: a thermo-electrical structure 30, column 4 line 47, that induces heat to and/or dissipates generated heat away from a region of a semiconductor body 22, fig. 1,

and at least one layer of a conductive material 20 in contact with the thermo-electrical structure 20 for conducting heat flow.

5. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5940784 to El-Husayni.

Regarding claims 1 and 7, El-Husayni discloses in fig. 1a-2 a heat regulating device for regulating a heat flow into and out of an integrated circuit semiconductor body comprising: a thermo-electrical structure, fig. 2, that induces heat to and/or dissipates generated heat away from a region of a semiconductor body (test sample), fig. 1A, and at least one layer of a conductive material (upper heat sink) in contact with the thermo-electrical structure for conducting heat flow.

6. Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5867990 to Ghoshal.

Regarding claims 1 and 7, Ghosal discloses in fig. 7 a heat regulating device for regulating a heat flow into and out of an integrated circuit semiconductor body comprising: a thermo-electrical structure (thermoelectric cooler), fig. 2 and 7, that induces heat to and/or dissipates generated heat away from a region of a semiconductor body (IC), fig. 7, and at least one layer of a conductive material (hot sink) in contact with the thermo-electrical structure for conducting heat flow, fig. 7.

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the

applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1-7 are rejected under 35 U.S.C. 102(e) as being anticipated by US 20050086948 to Milke-Rojo et al.

Regarding claims 1, Milke-Rojo discloses a heat regulating device 200 for regulating a heat flow into and out of an integrated circuit semiconductor body in fig. 1-5 comprising: a thermo-electrical structure 100/200 [0019] and [0020], that induces heat to and/or dissipates generated heat away from a region of a semiconductor body 208 [0020]; and at least one layer of a conductive material 204 [0020] in contact with the thermo-electrical structure 200 for conducting heat flow.

Regarding claim 2, Milke-Rojo discloses the heat regulating device wherein the thermo-electrical structure is trough within the body of the layer of the conductive material 204/206, fig. 1.

Regarding claims 3-6, Milke-Rojo discloses the heat regulating device further comprising a plurality of the thermo-electrical structures connected form a spreading assembly, fig. 3, wherein the spreading assembly is operatively connected to a heat sink 206 [0020], wherein the thermo-electrical structure is a conductive pathway for heat transfer, wherein the thermo-electrical structure has a structure selected from a group consisting of maze-shaped structure, fig. 3.

Regarding claim 7, Milke-Rojo discloses a heat regulating device for regulating a heat flow of an integrated circuit comprising: means 100/200, fig. 2, for inducing heat into or dissipating heat away from a region of a semiconductor body 208 of the

integrated circuit; and heat conducting means 204 in contact with the means 100/200 for inducing heat into or dissipating heat away from the region of the semiconductor body 208.

Regarding claims 23, 25-26, Milke-Rojo discloses a heat regulating device with components 204 embedded into the spreading assembly to manage the heat flow away from and/or into the semiconductor body 208, wherein the thermo-electrical structure being embedded with measuring device to measure various physical properties of the semiconductor body, fig. 2, wherein the thermo-electrical structure being external element attached to the surface of the heat regulating device, fig. 3-4.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 20050086948 to Milke-Rojo et al. in view of US 6729383 to Cannell et al.

Regarding claim 24, Milke-Rojo doe not disclose a heat regulating device wherein the thermo-electrical structure having a denser distribution of line patterns towards the center of the structure and a less dense distribution of lines towards the outer limits of the structure.

However, Cannel a heat dissipating structure can be formed in various arrangements, col. 2 lines 49-57. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to use the teaching of Cannell with Milke-Rojo as claimed, because it would have either increased or decreased the heat transfer surface for intended used.

12. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 20050086948 to Milke-Rojo et al. in view of US 6952050 to Kwon et al.

Regarding claim 27, Milke-Rojo does disclose a heat regulating device fabricated from a combination of various layers of silicon or ceramic [0024]

But Milke-Rojo does not disclose a heat regulating device fabricated from a combination of various layers of silicon carbide and diamond.

However, Kwon discloses a heat dissipating material 160 can be made from material including silicon, graphite, or diamond. At the time the invention was made; it would have been obvious to one of ordinary skill in the art to

replace the silicon or ceramic material of Milke-Rojo with the diamond layer teaching of Kwon, because it would have created a high thermal conductivity material as taught by Kwon, col. 3 lines 54-60.

Response to Arguments

13. Applicant's arguments filed 08 Dec 2005 have been fully considered but they are not persuasive. The Applicant argues that Hanners does not disclose the thermal structure capable of inducing heat into and/or dissipating heat way from a region of a semiconductor body. This is not persuasive because Hanners device would dissipate heat away from a region of semiconductor body; thus it would read on the claim limitation.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao X. Le whose telephone number is (571) 272-1708. The examiner can normally be reached on M-F from 8:00 AM - 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on (571) 272 -1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thao X. Le
27 Dec. 2005